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Reception analyses of science news: Evaluating focus groups as a research method

di Richard Holliman*

1. Introduction

This paper critically evaluates methodological issues relevant to using focus groups in media reception analyses. Focus groups have become a popular research method in recent years for social researchers (Morgan, 1993), and, more recently, for politicians and political parties (Kitzinger and Barbour, 1999). However, they have been used as far back as the 1920s for market research, and Robert Merton used them for sociological research in the 1940s and 1950s (Kitzinger, 1994; Hansen *et al.*, 1998). More recently, media researchers have used focus groups in reception analyses of a range of topics, including biomedical and scientific issues (e.g. Reilly, 1999; Durant *et al.*, 1996; Hornig Priest, 1994; Kitzinger, 1990). Through consideration of the literature on focus groups and qualitative data analysis, this paper addresses the following questions:

- What are the benefits and drawbacks of using focus groups in media reception analyses?
- What are the challenges in recruiting and sampling pre-existing groups?
- What factors influence the structure of focus groups investigating media reception?
- What issues face moderators when conducting focus groups?
- How do you produce and analyse data generated during focus groups?
- What strategies can focus group researchers employ to demonstrate validity and reliability?

In addressing these questions this paper draws on the experiences of conducting and analysing 32 focus groups that investigated audience reception of media coverage of newly-published scientific and biomedical issues, including

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cloning experiments; analyses of the Martian meteorite ALH84001; «Gulf War syndrome»; and genetic explanations for intelligence and sexuality (e.g. Holliman, 2004 e 2000)¹.

What, then, are the benefits and drawbacks of using focus groups to investigate the reception of science news? Initially the answer to this question is informed by theoretical developments in the sociology of media, where ideas about media influence have developed to address audience interpretation and contextualisation of media messages. These more complex approaches situate audience reception within «the universe of other media messages and with the material and social realities of people's lives» (Kitzinger, 1999, p. 11). It follows that media researchers who accept this premise require a method that facilitates investigation of these complex processes of reception. Furthermore, the choice was influenced by recent debates about the public understanding of science, where concerns about a lack of scientific literacy in the wider populace have been fuelled by research that seeks to «test» an individual's knowledge of science. This approach has been criticised for a number of reasons, not least because it is seen as self-fulfilling: in effect, by starting from the premise that the public are in deficit of scientific knowledge and then devising «tests» to falsify this hypothesis, unless the research participants answer each question correctly these research activities will, in all likelihood, support the original premise. Moreover, because deficit tests are pre-defined, often in the form of questionnaires, they tend to illuminate what participants *do not know* in terms of the language and culture of those asking the questions (and defining the answers), rather than what participants *do know* as scientific citizens².

Rather than imposing closed questions to «test» participants' scientific literacy, or inquire about media influence, these reception studies investigated the following research questions:

- How do participants interpret and contextualise newly-published science?
- Do processes of enculturation into scientific or journalistic practices influence the reception of science news?
- Does science news influence the construction of scientific citizenship?
- Do media representations of newly-published science influence participant's views of the epistemological status of science?

These questions place greater emphasis on how participants make sense of media reporting of newly-published science within a given social context and using their own vocabulary. To investigate how participants interpreted and contextualised this «new» knowledge required a method that allowed them to articulate their views with minimal intervention from the researcher. Focus groups have the potential to make such an approach possible. Kitzinger and Barbour (1999, pp. 4-5) describe focus groups in the following terms:

Focus groups are group discussions exploring a specific set of issues. The group is «focused» in that it involves some kind of collective activity - such as viewing a video, exam-

1. These experiences will be referred to throughout this paper.

2. See Irvin and Michael (2003) for a critique.

ining a single health promotion message, or simply debating a set of questions. Crucially, focus groups are distinguished from the broader category of group interviews by the explicit use of interaction to generate data. Instead of asking questions of each person in turn, focus group researchers encourage participants to talk to one another: asking questions, exchanging anecdotes, and commenting on each others' experiences and points of view. (...) Crucially, group work explores how accounts are articulated, censured, opposed and changed through social interaction and how this relates to peer communication and group norms.

Kitzinger and Barbour note the importance of including a focused collective activity, and the use of interaction to generate data (see also Morgan, 1997; Hansen *et al.*, 1998). It follows that, if the structure and purpose are carefully designed, focus groups have the potential to facilitate analysis of the similarity and diversity of opinions from a variety of research participants (Kitzinger, 1994). Thus, media researchers can investigate similarities and differences in how participants interpret and contextualise science news. In addition, focus groups provide an opportunity for participants to discuss specific topics, such as news reporting of newly-published science, in an informal and supportive environment, using their own concepts, frames of reference and vocabulary (Kitzinger and Barbour, 1999). This provides the researcher with the opportunity to explore what participants *do know* about science news, situating this approach within ethnographic approaches to studying the public understanding of science (Irwin and Michael, 2003)³.

Having adopted this approach, focus groups require a sufficiently focused structure to facilitate interaction with minimal intervention from the researcher. For example, the focused activity needs to be free standing, in that participants require all the information, equipment and instructions for the entire activity before they begin work. By introducing a focused activity then, the researcher is still committed to an ethnographic approach because they are studying how participants interpret and contextualise science news through interaction, using their own terms and vocabulary. However, this is not an ethnographic approach in the sense of studying «naturally occurring» behaviour, because the researcher imposes both the topic and structure on the interaction (Kitzinger, 1994; Hansen *et al.*, 1998). This does not preclude attempts to provide a more «authentic» research setting, e.g., through sampling for pre-existing groups, where participants already knew each other, as friends, or work colleagues, etc. The benefits of using pre-existing groups are that they provide a supportive environment where participants can feel confident in discussing issues (Kitzinger, 1994).

There are challenges to using pre-existing groups, however, not least because participants will be members of more than one social grouping. This is likely to affect how they interpret and contextualise the issue under discussion. For example, a group of parents may prioritise different issues for discussion when compared with a group of work colleagues, and yet the groups may con-

3. More pragmatically, focus groups involve a larger number of participants than would be possible through either individual interviews or participant observation (Kitzinger and Barbour, 1999).

tain one or more of the same participants. Furthermore, an individual's identity within a pre-existing group is not fixed over time. For example, one of the groups discussed in this paper, a group of friends of more than 20 years, included a teacher, a personal assistant, a computer technician, a student and an aircraft technician, respectively. During the course of the group it became apparent that two of these participants were university graduates, whilst the others left school at 16. This introduced a pre-existing hierarchy to the group interaction, unknown to the researcher prior to the group interview, based primarily on the educational experiences of the participants. It follows that members of pre-existing groups may feel self-conscious or reticent about how they contribute in this context (Kitzinger and Barbour, 1999; Morgan, 1997).

This introduces a key role for the moderator; the person who conducts the focus group who may - or may not - be one of the research team. Moderators need to be sensitive to established norms and hierarchies when working with pre-existing groups, developing reflexive skills, e.g., in «reading» participant interaction, then judging when and when not to intervene (*ibid.*) At the same time researchers will need to generate a rapport with the group; a task that has important ethical dimensions in terms of the relationship between the researcher and research participants (see Duncombe and Jessop, 2002). Again, this affects when and how moderators interact with research participants, e.g. to probe differences of opinion. It will also influence how much information is provided before, during and after the interview, how the group is structured, and which data collection methods are used. However, even if researchers are successful in these areas with most of the participants, some may still feel excluded in terms of their contributions. To this end, researchers have introduced individually completed questionnaires, providing participants with a chance to comment independent of the group interaction. This is a particular issue when researching sensitive topics, such as media reporting of biomedical research. Participants may not wish to discuss confidential information in a group environment, especially while among those who they have an existing relationship with, as would be the case with pre-existing groups (Kitzinger, 1994). In this instance, researchers may wish to use other methods in combination with focus groups, e.g. conducting follow-up interviews with particular individuals.

2. Sampling and recruitment issues

Focus groups generally involve small samples (Morgan, 1993), as researchers rarely commit themselves to constructing a representative sample for the purposes of generalisation. Rather, they tend to construct qualitative or structured samples that facilitate a deeper or richer interpretation of the issue to be investigated (Kitzinger and Barbour, 1999). Social researchers should therefore construct samples that are appropriate to the research questions they are addressing, within practical considerations of time and resources (*ibid.*).

In the reception studies discussed in this paper, a structured sample of pre-existing groups was constructed to investigate how participants interpreted and contextualised reporting of newly-published science, and whether the proc-

esses of enculturation into scientific or journalistic practices influenced reception of science news. As a result, some groups were chosen to reflect those who might have a particular view on the public presentation of science (e.g. trainee journalists, scientists), while others were chosen because they were not perceived to have a specific interest in this area (e.g. retired people, office staff)⁴. In so doing, this research involved a purposive sample, thus increasing the likelihood that opinions that might otherwise have been excluded could be heard. Of course, this does not guarantee that all viewpoints will be considered, as participants who are either not interested in the issue for discussion or who find a group environment intimidating may not wish to participate (Kitzinger and Barbour, 1999). If this latter issue is identified then researchers may wish to work with smaller groups, or conduct individual interviews.

How many groups should be conducted? This depends on the research questions and practical constraints (Hansen *et al.*, 1998), and whether researchers are happy to combine data collection and analysis, as per a grounded theory approach (Glaser and Strauss, 1967). Further to this, if a project includes a range of methods, e.g. where focus groups are used to inform the construction of a questionnaire, then fewer groups may be needed. As a general principle, researchers should be flexible about their sample size, continuing to sample at least until they are confident that continued data generation will not further inform their analyses (Morgan, 1997)⁵. In the reception studies discussed here, between six and seven groups were conducted for each scientific issue to be discussed, at least two of which were 'scientist' groups.

A further related issue is how many participants make up a focus group. Some media researchers have argued that the optimum number of participants is between six and ten people (e.g. Hansen *et al.*, 1998). Others have noted, however, that media researchers have worked with groups containing as few as three participants (Kitzinger and Barbour, 1999). Others still have, on occasions, worked with groups of between 15 and 20 (Morgan, 1997). Answers to how many participants should form a focus group therefore range from between three and 20. In the reception analyses discussed in this paper, this decision was based on the type of interaction required in the focused activity. Thus, it was decided to work with groups of between three and eight so that each of the participants could be involved in what was a demanding exercise (see below for further discussion). However, participant interaction is not the only factor to consider. For example, inexperienced researchers may wish to work with smaller groups, particularly when starting a new research project.

Of course, the issue of group size is often subject to practical considerations of recruitment. Researchers may need to negotiate access through gatekeepers and this can influence the selection of participants (Kitzinger and

4. A similar approach has been adopted in other studies (e.g. Kitzinger 1990, 1994; Philo, 1990; Durant *et al.*, 1996). Morgan (1997) describes this process of sampling groups by pre-defined categories as segmentation.

5. For those adopting a grounded theory approach, this is the process of «theoretical sampling» (Glaser and Strauss, 1967).

Barbour, 1999; Miller and Bell, 2002). There are ethical issues to consider here, particularly if the research has the potential to include discussion of sensitive topics, or participants who see themselves as socially excluded (see Miller and Bell, 2002); issues that may be compounded if the researcher is not directly involved in this recruitment, not least because gatekeepers may provide incorrect or mis-leading information about the research (Kitzinger and Barbour, 1999). To counteract this, researchers can provide briefing documents to be delivered to prospective participants. At this point, researchers need to consider what information participants require to make an informed decision about participation.

At the very least, participants should be informed about incentives for participating and how data from the focus group will be stored. More pragmatically, they should be given details about where and when the research will take place and how long it is due to last. Furthermore, participants should be informed about the nature and purpose of the research⁶ and of how the findings will be used; a particular challenge for researchers because the processes of data collection and analysis may affect this. As Miller and Bell (2002, p. 54) argue:

(...) we identify knowledge production as being grounded in individual and collective experiences and this means that the course of a project may only be guessed at initially. While informing participants about the research aims at the outset of a project is vital, final research findings may not resonate with those aims. The precise nature of «consent» for the participants might only become clear eventually, at the end of the study, when the researcher's impact on shaping the study is visible. This raises questions about what it is that the participant is consenting to.

To address this issue, the researcher should reflect on their previous and ongoing experiences as the research progresses (e.g. by keeping a research diary), using this information to inform participants as effectively as can be anticipated about these issues. Furthermore, participants could be invited to take a more participatory approach to the co-production of the research account, e.g. through access to the group's transcript (*ibid.*); an approach which can addresses issues of validity.

Researchers also need to decide whether participants should complete preparatory work prior to the group. If the key aim of the research is for participants to participate «unprepared», as was the case in the studies of science news, participants should be informed of this. Moreover, researchers need to consider how often the focus groups should meet and, where relevant to the study, when. In terms of the studies of science news, the groups met once, in a context where they would normally expect to meet⁷, for between 2-2½ hours.

6. In terms of the reception studies discussed here, participants were invited to discuss their views of science in the media. It was clearly stated that the research was not designed to 'test' their knowledge of science or the media.

7. As a minimum requirement, researchers should seek a quiet, easily accessible but private space where the group is unlikely to be disturbed or observed by non-research participants (Kitzinger and

The groups took place approximately 8-9 months after the topic for discussion was a prominent issue in terms of media reporting. This highlights one of the difficulties of conducting audience research; that media coverage can continue to develop as reception analyses are being conducted. One way of countering this problem is to arrange for the groups to meet more than once. For example, Reilly (1999) used focus groups to investigate participants' attitudes to the BSE crisis. Initially, she ran 26 focus groups in 1992-3, reconvening 13 of them in 1996 to investigate whether participants' views had changed following further media reporting (*ibid.*). Others have conducted studies where focus groups have reconvened on several occasions over a number of months; e.g. in a study of secondary school teachers' attitudes to teaching controversial issues, Gayford (2002) organised focus groups to meet on three separate occasions over a period of eight months, thus providing a reflection period between meetings. These examples illustrate that there is no single answer to how often focus groups should meet. Overall, researchers should consider whether a single meeting will adequately inform their research questions, in combination with more pragmatic considerations of access to research participants and resources.

3. Structuring the focus group

This section outlines a structure, developed from earlier work (e.g. Kitzinger, 1990; Philo, 1990), that can facilitate comparative analyses of participants' views on news media reporting of science⁸. There are seven stages, as illustrated in tab. 1.

Tab. 1 - Illustrating the structure of the focus group

Stage	Task	Organisation
1	Initial briefing	Moderator-led
2	Initial questionnaire	Completed as individuals
3	Preparation of activity	Interaction - participant led
4	Delivery of activity	Interaction - participant led
5	General discussion	Interaction - moderator as facilitator
6	Final questionnaire	Completed as individuals
7	Final debriefing	Moderator-led

Stage 1

This is the initial briefing when the focus group convenes. It should reiter-

Barbour, 1999).

8. For example, Holliman (2000) used the structure outlined in Table 1 to compare participants' views on media coverage of cloning experiments, analyses of the Martian meteorite ALH84001 and «Gulf War syndrome».

ate information provided during the recruitment process, and deliver any further details as necessary. If, for whatever reason, participants have been misinformed about the nature and purpose of the research at the recruitment stage, e.g. because this information was mediated through a gatekeeper (see Kitzinger and Barbour, 1999), then the researcher should provide a full briefing so that participants can make an informed decision about whether to participate.

Stage 2

Each participant completes a questionnaire that documents demographic information and invites participants to reflect on their views of the topic under discussion. As discussed earlier in relation to working with pre-existing groups, this initial questionnaire allows participants to comment outside of the group environment (participants also comment individually in the final questionnaires and/or debriefing - see Stages 6 and 7).

Stage 3

Participants work together to complete a focused activity with minimal intervention from the researcher⁹, using stimulus material, including instructions (either written or oral), equipment (e.g. pens, paper) and resources (e.g. images from media coverage) to facilitate this process.

In the reception studies discussed in this paper, participants took part in the «news game» exercise (originally developed by Philo, 1990). Here participants were given between 20-30 minutes to generate either a television news bulletin (including a script and image montage), or a newspaper article (including the headline, text and use of images) using images selected to represent media coverage of the scientific issue under discussion¹⁰. These images were numbered, allowing the researcher to record which material was used and in what order.

Stage 4

Participants present the artefact produced in Stage 3, e.g. with one participant reading the text in the role of a newsreader (for the television news bulletins), or journalist (for a newspaper article) and another demonstrating which images have been used (for television news bulletins, these are shown in sequence). Researchers should retain a flexible approach to this activity, allowing all willing participants to be involved, e.g. in several of the groups discussed here, additional participants acted as interviewees, and one group performed their news script as a fictional play. Maintaining this flexibility resulted in the collection of interesting and informative data. The question for the researcher, however, is whether such flexibility is appropriate to their investigation.

9. Earlier, it was argued that one of the aims of the reception studies discussed in this paper was to investigate how participants interpreted and contextualised science news. Stages 3 and 4 were organised to ensure minimal researcher intervention. During these stages the researcher observes, generating field notes.

10. To construct a representative sample of authentic images researchers should complete an analysis of media content (Kitzinger, 1990; Holliman, 2004).

Stage 5

Participants reflect on their decisions from Stage 3 and discuss their views about media coverage of science. This is facilitated by the researcher through a series of open-ended questions that probe participants' views, e.g. on the perceived authenticity of the news artefact presented in Stage 3. By adopting a flexible approach the researcher can develop these open ended questions by reflecting on the original research questions, the field notes from Stages 3-4, and relevant data from any groups that have been completed.

Stage 6

Participants complete a final questionnaire where they reflect on their experiences of taking part in the research.

Stage 7

The researcher invites questions from participants and provides them with any relevant information about the research. For example, if participants have exchanged misinformation or developed misconceptions during the course of the focus group, the researcher should address this through dialogue and/or by providing relevant literature (Kitzinger and Barbour, 1999).

4. Data production and analysis

Following the structure outlined above, the data collected during the focus groups that investigated science news were of several different types. The initial and final questionnaires were completed by individual participants in hard copy and the quantitative data from these questionnaires was collated and analysed using a spreadsheet. Primarily though, focus groups generate data through interaction. Given the complex, dynamic nature of these interactions, it is essential that a permanent record is produced. To this end, field notes can be taken, particularly during Stages 3 and 4 when the researcher is an observer¹¹; a process that is a theoretically saturated activity, involving observation and analysis (Silverman, 2000). Furthermore, in Stage 4, where participants were asked to produce a record of their artefacts in hard copy, either as a script for a television news bulletin, or as a newspaper article, the language and structure of these artefacts was compared across the groups and against analyses of media content (Holliman, 2004 e 2000). However, these approaches are generally not sufficient to provide an accurate record of such dynamic interaction by themselves (Silverman, 1993); Stages 3, 4 and 5 should be recorded, e.g. using an audio-tape recorder, the tape of which can then be transcribed.

There is considerable discussion regarding the production of transcripts. Several issues are generally agreed upon, however; e.g. the process of tran-

11. These field notes record non-verbal communication, which images were used in the news game and any issues to be revisited in Stage 5.

scription is a theoretically saturated analytical activity, which will affect subsequent analyses (Silverman, 1993 e 2000). The practical challenges in transcribing focus group discussions have been noted, not least because they are time-consuming to produce and it can be difficult to delineate individual voices (Kitzinger, 1990). In terms of the former issue, researchers may choose to employ professional transcribers. However, this removes the opportunity to use transcription as part of the data analysis process. Moreover, this may compound the second issue; delineating individual voices. To improve this situation, researchers should invite participants to introduce themselves at the start of the recording (Hansen *et al.*, 1998). Furthermore, dependent of the type of analysis to be conducted, researchers can provide the transcriber with a style sheet, noting how content and interaction should be recorded.

Researchers will approach data with, at the very least, implicit theoretical assumptions which will influence the analysis (Silverman, 1993). However, it does not follow that analytical categories have to be decided *a priori* (Hornig Priest, 1994). The resulting process is dynamic; an iterative cycle that both informs - and is informed - by theoretical considerations and empirical observations. In adopting this approach, the process of analysis is more flexible at the beginning as researchers investigate the data for emergent questions (Pidgeon and Henwood, 1996), leading to a more focused set of categories that are applied through comparison. These processes can then be further informed through deviant case analyses, both within and across groups, thus addressing issues of validity (Silverman, 2000). This should involve comprehensive data treatment, investigating the entire data set (*ibid.*) both in terms of content (e.g. what the participants say and produce in Stage 4) and interaction (e.g. how the participants interact with each other and the researcher). Given the range of data discussed above, researchers should be willing to investigate them in combination, not relying solely on the transcript alone, e.g. by comparing transcripts with original recordings and field notes to analyse spoken and non-verbal communication. Furthermore, researchers may wish to compare the production of the artefact in Stage 3 with the final product. Researchers should also consider the group interaction, e.g. how participants' opinions are articulated, challenged or reinforced.

In the case of the reception studies discussed here, these processes were facilitated though computer assisted qualitative data analysis software (CAQDAS), in part because the researcher can work more speedily and systematically, coding large data sets (Hansen *et al.*, 1998; Seale, 2000). In short, researchers using CAQDAS spend less time on the routine of data analysis, and more time investigating their full data set, thus addressing issues of validity (Silverman, 2000); e.g. researchers can code and re-code transcripts, easily retrieving all instances of particular coded segments, or combinations of coded categories (Hansen *et al.*, 1998; Seale, 2000). This process facilitates the development of the researcher's conceptual understanding, e.g. through introducing or collapsing categories and investigating their inter-relationships¹². To

12. CAQDAS programs may not be useful for all theoretical approaches and/or small data sets (Se-

develop an overall understanding of these conceptual inter-relationships (Hansen *et al.*, 1998), researchers may choose to represent them as a diagram or conceptual map (Seale, 2000). In grounded theory terms, this activity is the final stage of the analytical process (Pidgeon and Henwood, 1996).

5. Conclusion

The studies discussed in this paper were designed to investigate how participants interpreted and contextualised science news, and to examine whether the processes of enculturation into scientific and journalistic practices influence media reception. If structured appropriately, focus groups offer a flexible and dynamic approach to data collection and analysis, generating (mainly) qualitative data about specific topics through interaction between participants using their own language and vocabulary, and drawing on their pre-existing knowledge, attitudes and beliefs. This process can involve structured sampling of pre-existing groups, including those with or without a perceived interest in the topic for discussion. As such, focus groups can facilitate an ethnographic approach appropriate to investigating what participants *do know* about media reporting of science.

This paper has documented a focus group structure that allows participants to contribute both as individuals and through participant-led and moderator-led group interactions. This structure generates a range of data that can be analysed in combination, possibly through co-production with research participants. Researchers should conduct comprehensive, systematic data analysis, generating a clearly defined analytical framework, thus improving the reliability and validity of subsequent findings. This can be facilitated through the use of CAQDAS programs. In summary, focus groups can be a useful method for investigating media reception of science news, but this method should not be adopted uncritically. To make best use of focus groups researchers require a clear rationale for whether social interaction and focused activities will generate useful data that informs their research questions.

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ale, 2000).

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